

AMRAD NEWSLETTER

Amateur Radio Research and Development Corporation

July-August 1982

Upcoming AMRAD Meetings

On Monday, July 19, 1982, we will meet at 7:30 P.M. to hear a talk on "State-of-the-Art Remote Control Strategies" by Hal Feinstein, WB3KDU.

The next regular AMRAD meeting will be on Monday, August 2 at 7:30 P.M. The subject will be on packet radio.

Please mark both meetings on your calendar now because there will not be a separate meeting notice for the August 2 meeting. Both the July 19 and August 2 meetings will be held at the Patrick Henry Library, 101 Maple Ave E, (VA Rte 123), Vienna, Virginia. Visitors and guests are welcome.

Membership Directory

Instead of publishing an August issue of the AMRAD Newsletter, we will print a new membership directory which will be current as of mid July 1982. Copies will be mailed only to dues-paying members, not to those clubs or individuals who regularly receive exchange or complementary copies of the newsletter. Also, the directory is only for the information of the members and not for further dissemination or commercial use. A limited number of copies will be available for those who apply for membership for a few months after the directory mailing, or until the supply is exhausted. This new directory is but one result of the AMRAD computer data base which was designed, and is maintained, by Bill Pala, WB4NFB.

Maryland Hamfest, Sunday, July 25, 1982

The Baltimore Radio Amateur Television Society will sponsor a hamfest at the Howard County Fairgrounds on July 25. The site is 15 miles west of Baltimore just off I-70 at Rte 32 on Rte 144.

In This Issue...

You will see a new column entitled "Radio Amateur Telecommunications Society" by Gordon Battie, WB2CAM. The column highlights packet radio activities in the New Jersey area. We hope that Gordon will be a regular contributor.

Dave Borden, K8MMO, is back, this time with a relatively short "Protocol" column. That wasn't his intention, but a computer ate that portion of his column which dealt with 10-meter packet experiments. But, despair not; read further on this page.

AMRAD Librarian Needed

Tedd Riggs, KC4YN, advises that he is no longer able to act as custodian of the AMRAD library. The library is a collection of books, magazines and technical documents which occupy one bookcase. A volunteer in the Washington, DC area is needed to take on this job. Please contact Tedd, at home, on 703-573-5067, if there is any chance that you can take the library.

Ten-Meter 1200-Baud Packet Experiment

On May 31, 1982, Dave Borden, K8MMO, and Paul Rinaldo, W4RI, made a successful two-way 1200-baud packet QSO on 10 meters. We were both using VADCG INC boards, Bell 202-compatible modems, and ICOM IC-701 hf transceivers in the ssb mode. It was no great DX working between Sterling and McLean, VA, but we learned a few things.

The path is just long enough (with a couple of mountain ridges in between) that direct 2-meter fm communications has not been possible the times that it was tried. Normal packet communications is through the 148.81/21 repeater which is sometimes noisy due to two causes: (1) Dave's not-full-quieting signal into the repeater, and (2) some impulsive noise. So, on two meters, via the repeater, packet communications is usually good, but numerous retries are sometimes needed due to the impulsive noise. Also, experience indicates that packets should be kept short (half a line or so) to minimize the number of necessary retries.

The 10-meter QSO, which lasted over 2 hours, wasn't like that. Even though there was quite a bit of background noise on both signals, most packets got through without retries. That's true for long packets as well. Some two-line packets made it on the first try.

Receiver tuning was a bit critical. The main problem is that neither station had any tuning indicators on the modems. So, the RIT control was set by ear until a packet printed on the screen. Stability was good enough that we were able to stay connected without retuning for around 45 minutes at a time before drift made it necessary to correct the RIT.

Some of the transmissions sounded lousy, like the proverbial rain-barrel effect, indicating some amount of multipath. The packets printed anyway. Signals were fairly steady in strength with only slow, flat fading at times.

Plans are to try some 2-meter F1 tests (actually F2j) using 2-meter transceivers in the ssb mode.

If anyone who is capable of putting a 10-meter signal into the Washington, DC area would like to QSO on this mode, please give W4RI a jingle on 703-734-0878 days or eves.

8273 HDLC Protocol Chips

The twenty 8273s are now gone with no outstanding requests. So, it was not necessary to disappoint anyone who sent in their letter per the announcement in the June issue of the newsletter. We don't know whether it will be possible to repeat this offer, but we'll try to find out and let you know.

Membership Renewal

Please check your mailing label to see whether your membership has expired. If you see the word "RENEW," it's time to send in a membership renewal with a check.

Vancouver TNC Firmware and Software

As a member service, AMRAD will make available the latest firmware (on EPROMs) or software (on floppy disk) for the VADCG terminal node controller boards. Dave Borden, K8MMO has done this in the past. However, starting now, please direct your requests by letter to Terry Fox, WB4JFI, 1819 Anderson Rd, Falls Church, VA 22043.

For firmware: Supply four 2708s for unmodified board, or two 2716s or one 2732 for a board modified per WB4JFI's article in the June 82 newsletter. Specify where RAM starts (1000 hex for unmodified board, 8000 hex for WB4JFI modification). Specify if board includes WB4JFI speed modification per the July 82 newsletter. Specify HDLC address for your station (01-FE hex).

For software: Supply one standard IBM single-density, single-sided 8-inch floppy disk. This disk contains TIP and LIP programs as well as TNC board documentation.

In either case: Enclose US\$1 for mailing and include your name, call, and mailing address.

For Sale

Two Ultronic Data Pump 202/1200 Bell 202-compatible modems, with built-in power supplies. For pickup in McLean, VA (not shipment). \$50. Paul Rinaldo, W4RI, 1524 Springvale Ave, McLean, VA 22101, 703-356-8918.

Tally 1612 KSR, 180 cps, full ASCII keyboard with numeric keypad, 2k buffer RAM, RS-232 and 20/60-mA interface, LED readout of row or column, fully keyboard or host programmable. Very well-built device with printer stand and box of ribbons. 1.5 years old and used about 20 hours. Cost new \$2010. Will sell for \$750. Also, TI-59 calculator with PC-1000 printer. With EE, Math and general library modules, EE application book and 20 blank mag cards. perfect shape. \$225. A HyGain antenna 103 10-m 3-element beam with balun. Excellent shape. \$30. A Cushcraft Ringo Ranger 2-m vertical antenna, excellent shape. \$20. Tedd Riggs, KC4YN, 8402 Berea Ct, Vienna, VA 22180, 803-573-5067.

Sinclair ZX80/ZX81

Last month's newsletter carried an item on a ZX80/ZX81 users group in Prince Georges County, Maryland. The correct contact is Jim Wallis, N3ADF, 5448 Tilden Rd, Bladensburg, MD 20717, 301-699-8712.

Chuck Dorian, W3JPT, is trying to locate ham radio programs that will work with the ZX81. You can contact him at 4444 Chesapeake St NW, Washington, DC 20016, 202-362-7523.

Employment Opportunity

An rf technician with 1-3 years experience is needed for a small company. Please contact Al Leaman, Metropole Products Inc, 5409-A Vine St, Alexandria, VA 22310.

Correspondence

I am a ham radio operator with a Model III TRS-80 16-k computer. I would like to hook the computer to my radio to receive & send Morse code but I don't know exactly what to get or use to make the proper connections. I already have a program on tape to send and receive. Can you help me? - Dan Booth, KA5KRD, 11722 Raindrop, San Antonio, TX 78216.

(Ed. Note: AMRAD receives numerous letters of this type. We try to answer those for which we have current info but are not current on the TRS-80 Model III. If you have the data, please write Dan and drop a copy to AMRAD for future reference.)

My rig is home made tcvr with modem on i-f 500 kHz (with EMF 600 Hz wide). The system is home made uC based on 8085 (+8155+8279) + video display mapped in system memory under SW control (video

RAM with 2114). I started more than one year ago with HW, still don't have TX part of SW RTTY and I am not on the (20 meter) band. My resident SW (in 2716) is 1k simple monitor, 1/4k loader from tape recorder, 1/2k of video drivers and 1/4k Baudot reader. I am 29 years old, an EE graduated in 77 and working as a computer technician. But my hobby is SW developing. I would like to correspond with someone with the same interests. We are (just) starting with such subject here in OK land. - Petr Silinger, OK2SPS, Rymarovska 42, 78501 Sternberk, Czechoslovakia.

Logiciel en Français

Computerre annonce son entrée dans le domaine du logiciel pour ordinateur individuel et présente 24 programmes en français conçus pour l'ordinateur Apple. Le catalogue ci-joint comprend une description de ces programmes. Pour obtenir de plus amples renseignements, communiquez avec Computerre, C.P. 782, St. Laurent, PQ, H4L 4W2, Canada, 514-747-9130.

Audio Spectrum Analyzer(tm)

Radio Shack's new audio spectrum analyzer program (26-3156) provides a colorful display of the sound presented to their Color Computer's cassette port input. Both fast-response (peak) and slow-response (rms) modes are available. Vertical color bars, calibrated in dBs, represent 27 one-third-octave segments from 31.5 Hz to 12.5 kHz.

Short Course in Spread Spectrum

"Spread Spectrum Communications Systems" (302DC) is the name of a course to be run August 9-13, 1982 in Washington, DC. This course is for design engineers and supervisory-level engineers. It covers pseudorandom coding, frequency or time hopping, and combinations of these. There is no formal prerequisite, although some knowledge of communications and random processes would be helpful. Cost \$785. Contact The George Washington University, Continuing Engineering Education, Washington, DC 20052, 202-676-6106, 800-424-9773.

Winchester Interface Design Contest

The entrant must design a working host interface for the WD100-80 Winchester controller board, which in turn will control a 5-megabyte Shugart SA1002 Winchester drive. Some suggested computers to design host interfaces for are: TRS-80 Models I, II & III, Apple II and III, IBM PC, Big Board, Osborne, DEC, Motorola Xorcisor, SS-50, Heath/Zenith, Xerox, etc. CDI must be granted permission to publish and/or use the designs and software submitted. A contestant is entered when CDI receives a completed entry blank along with full documentation, parts list, schematic and software listing. If requested by CDI, to be eligible for first and second prizes, the contestant must provide CDI (within two weeks of the date requested), a working host interface board, along with disk-based software. CDI will evaluate the interfaces and return them. Entries must be received by midnight, August 31, 1982, to be eligible for prizes which will be awarded by November 30, 1982. The design must be the original work of the entrant or be derived from public-domain material.

Prizes are:

First Prize: A 10-Mbyte Winchester prototyping kit, with WD1000 controller board and 2 Shugart SA1002 Winchester drives.

Second Prize: A 5-Mbyte Winchester prototyping kit, with one WS100 controller board and 1 Shugart SA1002 Winchester drive.

Third and Fourth Prizes: One Shugart SA1002 5-Mbyte Winchester drive.

Fifth to Tenth Prizes : A 50% discount on orders for CDI Winchester disk products.

All eligible entrants will receive a \$50 CDI gift certificate applicable to WD100-80 controllers or Shugart SA1002 disk drives. Entry forms are available by sending an s.a.s.e. to Jim Harvey, Computer Dynamics, Inc., 105 South Main St, Greer, SC 29651, 803-877-7471.

Terry Fox, WB4JFI
1819 Anderson Rd
Falls Church, VA 22043
703-356-8334



THE DEAF AND THE TTY

Barry Strassler, Executive Director
Telecommunications for the Deaf, Inc.
814 Thayer Avenue
Silver Spring, MD 20910
301-589-3006 (Voice/TTY)

IS LINE 21 INCOMPATIBILITY A MYTH?

For the past several years, deaf people have been told that the proposed CBS teletext is incompatible with Line 21 decoders and that deaf people would need to purchase additional equipment. Is it a myth?

One very prominent government official claimed that teletext can be made compatible with existing TeleCaption equipment if both are used on Line 21. This remark rather surprised me, so I decided to do some digging of my own. After all, TDI has a responsibility to its members, and misinformation could have dire consequences.

To my surprise, very little material, beneath the superficial level, can be found on teletext and Line 21. So, I had to pick the brains of people very knowledgeable in this field, and their responses were mixed.

One version says that if the FCC decrees Line 21 to be the standard for close captioning systems for the deaf, then CBS will have no choice except to assure compatibility with their rival equipment. But it has been disclosed that the FCC has been loathe to lay down a decision, preferring to let the private sector set its own standards. Another source tells me that even if CBS adopts

Line 21, it does not mean that it will be compatible with the TeleCaption devices. It would mean that Line 21 would be the conduit for rival systems to play their incompatible devices. One rather dubious source from CBS (I refuse to confirm this one) claims that all it needs to make the two compatible is a small chip costing anywhere between \$25 and \$100.

I spoke with an official of the National Captioning Institute, which is responsible for captioning programs by ABC, NBC and PBS. He said that Line 21 compatibility is a vague matter. The TeleCaption device is a very flexible gadget, capable of incorporating varied features such as a TDD. It is possible to convert it to a RTTY decoder for the deaf (an RTTY station existed in Philadelphia a few years ago and served 750 deaf households before it closed due to funding cutbacks). It is possible to include TV games. In fact, he said, there is no limit to what can be done with this device. So, by this reasoning, he said that while it is possible to combine teletext features with the TeleCaption features, proponents of this approach would have to be more specific about what they have in mind so that it could be designed for mass use.

Does it make sense? If any of you have answers, I would greatly appreciate hearing from you.

(continued from page 3)

Modification Testing

After building the interface on a piece of prototype board, plug in all ICs but the 74LS175. Instead of it, plug in a DIP switch mounted to a 16-pin DIP header wired as shown in Fig. 4. This will allow you to test the interface without changing any software. For 1200-baud operation, switches 1 and 4 should be on, while 2 and 3 are off. Now try the board out to make sure all your wiring is correct. If it is, unplug the switch assembly, and plug in the 74LS175. Now you will have to use software that has a routine added to it that sets the baud rate. If this routine isn't added, the board will run at whatever speed it powers up at, and it won't be changeable. Now try the board again with the 74LS175 installed. If everything works like normal, you now have software controlled baud rate! If not, check your wiring to make sure all is normal. If it still doesn't run right, try with the switch again, or remove the board altogether and try the 4024 again.

Well, there you have it, computer-controlled speed on your TNC board. Next time we will modify the TNC to do everything else under the sun, including running self-generating, self-modifying, self-running, and self-crashing super PACKET MANiac software in color!!

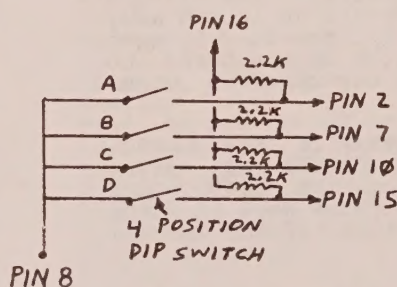


Fig. 4 -
Test Switch

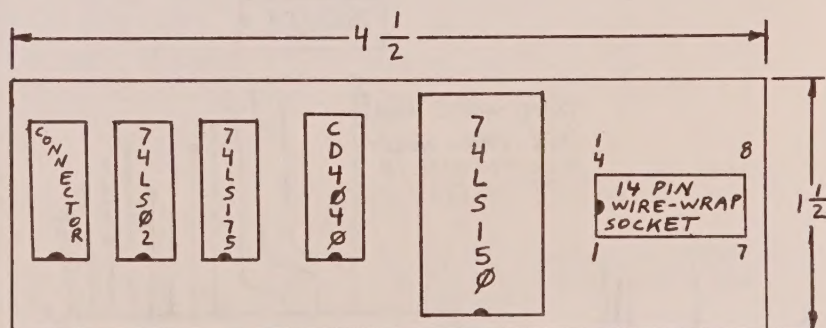


Fig. 3 - Modification Layout

DATA BUS	SPEED	DATA BUS	SPEED
0000	18.75 BAUD	1000	4800 BAUD
0001	37.5 BAUD	1001	9600 BAUD
0010	75 BAUD	1010	19200 BAUD
0011	150 BAUD	1011	38400 BAUD
0100	300 BAUD	1100	NONE
0101	600 BAUD	1101	NONE
0110	1200 BAUD	1110	NONE
0111	2400 BAUD	1111	NONE

Table 1 - Speed Rates



Tucson Amateur Packet Radio Activities

Den Connors, KD2S
P.O. Box 22888
Tucson, AZ 85734

(EXTRA! The following was written on June 27:)

After several hours of transmission of test packets, Lyle Johnson WA7GXD successfully initiated the first amateur packet radio contact with all-American hardware and software, using the Tucson Amateur Packet Radio Corporation Terminal Node Controller (TNC), at 9:12 P.M. MST, June 25th, 1982. At the receiving end was Den Connors, KD2S, who was co-located with Lyle at the WA7GXD station.

The two-way contact lasted for about one hour, during which time several different experiments were conducted to determine optimal selection of components for the TNC modem amplifier/filter set.

Within twelve hours of first QSO, the experiment was repeated over a distance of about twenty miles, from one side of Tucson to the other, over conditions which were as bad as "less than S1", with total success. Tucson's first packet "rag-chew" lasted about 45 minutes, with different antenna and signal-level combinations attempted by Lyle and Den.

Also at the first transmissions were Marc Chamberlin WA7PXW, the TAPR Software Chairman, Margaret Morrison KC7MA, the TAPR Publicity Chairman, and Heather Johnson N7DZU, a member of the Publicity Committee.

These tests culminated hundreds of hours of effort on WA7GXD's part, who has spearheaded the design of the TNC as Hardware Chairman. Completion of modifications to the on-board modem next week will allow Lyle to release a final version of the TNC to a local Computer-Assisted Design firm for the artwork and construction of TAPR TNC Beta boards, which are slated for a July release.

In parallel with the hardware efforts are those of WA7PXW, who has been using a Point Four mini-computer as the development system for TAPR TNC software. Marc has completed the simulation of interfaces between the TNC and an attached terminal, as well as between the device and the radio link. On the link side, normal user operations, net-control functions and digipeater operations have all been successfully simulated.

The FORTH software will be loaded into an Apple microcomputer for final debugging, and then loaded into an AIM 65 micro for PROM-burning. Expected arrival of TAPR Beta systems into the first ten U.S. and Canadian cities for phase one of beta test is due in five to eleven weeks.

(The regular "TAPR" column follows:)

Hello from a very excited bunch of hams in Southern Arizona! We have expanded our numbers very rapidly in the last month, are dangerously close to finishing our alpha hardware testing and the initial interface and protocol software, and have heard first test packets from our boards. We were involved in the ARRL SW Convention during the first weekend in June, with great success, and we have been "pushing packets" through a new public relations staff. We have also formed a non-profit scientific corporation to handle relations with a number of corporations, university groups and government agencies, in an effort to expand the size and breadth of the amateur packet radio effort.

On June 2, 1982, the Tucson Amateur Packet Radio Corporation was licensed in the state of Arizona as a non-profit scientific corporation. The stated purposes of the corporation are: "...scientific testing and research into the development and improvement of communication systems for use in the Amateur Radio Service, including but not limited to digital packet radio communications; the research and testing of systems, hardware and software for packet radio local area networks and computer network systems; and disseminating to the public information obtained as a product of such research and testing...". The TAPR Corporation was formed to serve as a liaison between standards organizations, profit and non-profit corporations and the amateur radio groups interested in this new technology.

TAPR and AMRAD will be forming formal affiliation later this month, and will be working together closely on very common grounds.

TAPR Hardware Report de Lyle Johnson, WA7GXD

The Southwestern Division ARRL Convention in San Diego was a smashing success from the Packet Radio standpoint. Alpha TNCs were connected via hardware link, and two terminals were connected up so folks could send packets back and forth. ARRL President Vic Clark, W4KFC, visited the TAPR booth and was given a brief demonstration of this exciting new mode. The Saturday A.M. forum was so successful that TAPR ran an unscheduled "Introduction to Packet Radio" presentation that afternoon. The hall was packed, with the overflow lining the walls. Eventually, the doors were opened and people were crowding in the hallway, straining to catch every word. Many an ASCII/RTTY buff appeared ready to convert, with plenty of active audience participation. An unqualified success.

Alpha boards are currently running some diagnostic software that reports on CRC status, etc., for hardware/modem debugging. This software allows direct interface to the TAPR/FORTH kernel for hardware interaction. The net effect is to greatly accelerate hardware debugging and patching.

Alpha boards appear to be about 95% functional as of this writing (10 June 1982). The weekly TAPR net of 9 June 82 witnessed the first TAPR packet transmission when WA7GXD surprised everyone with a couple of test messages. The real "acid test" of exchanged packets via radio link is anticipated for the weekend of 12-13 June 1982, barring any unforeseen interference from jobs and other such meddling.

The Beta Test of the TAPR TNC is planned to start sometime in July. While Alpha Test is primarily hardware-related, with software/protocol feasibility testing thrown in. Beta Test is primarily software/protocol oriented, with interfacing the primary hardware goal.

The Hardware group will be supporting the Beta Software testing by providing an EPROM-programming adapter for the TAPR TNC. This adapter connects to the parallel user port, and will enable the Beta Test Site to program the 2732 EPROMs used in the TNC. It is expected that each Beta Test Coordinator will obtain one of these adapters for his particular site and do the programming for his group. This will enhance the flow of software update information and free the Tucson group from excessive correspondence in this regard.

MILL NECK FOUNDATION MOBILE TELECOMMUNICATIONS RESOURCE CENTER

Rudolph H. Auslander
86 Polaris Drive
Levittown, NY 11756

The Mill Neck Foundation, a non-profit organization dedicated to assisting Lutheran Churches and Missions throughout the world in helping the deaf. The Mobile Telecommunications Unit which the Foundation will sponsor will be the first of its type anywhere. It could well be a precursor of an enlarged permanent facility on the campus of Mill Neck Manor School for the Deaf.

Although telecommunications devices for the deaf (TDDs) have been in use for over fourteen years, for one reason or another it is only within the past few years that they have become available to many deaf people. There are still many deaf people, as well as hearing parents of deaf children, who have little or no knowledge of these devices. Even businesses, government agencies and organizations involved in serving the deaf community lack proper knowledge of these devices.

The mobile unit will will feature:

- TDD equipment
- An audiometric booth for hearing tests
- A microcomputer to demonstrate uses for the deaf
- Signaling devices (vibrators, flashers)
- TV captioning devices.

The mobile unit will give the deaf and the hearing public an opportunity to observe and try out the various devices and give training in their proper use. It is to assist organizations, government agencies and businesses in setting up TDDs and provide on-site training. It can loan TDDs to churches, hospitals and other groups in emergencies. It can assist in raising funds for the needy. It will assist organizations for the deaf in promoting telecommunications by providing on-site support at meetings. It will disseminate information on the latest technical and legislative developments on TDDs. It will provide training in the use of microcomputers for deaf communications.

Plans are to complete this mobile center in about six months.

For further information, contact Henry O. Bjorlie of the Mill Neck Manor Foundation, Inc., P.O. Box 12, Mill Neck, New York, NY 11765, 516-922-4100 (TTY/voice).

(Ed. Note: AMRAD has been corresponding with the writer of this article concerning the mobile center. Rudy writes that there is a possibility of bringing it to the Washington area.)

(TAPR continued from page 5)

The Beta-specific Hardware goals are to interface the TAPR TNC to as many radios and computers/terminals as possible. Each Beta Site will provide a list of radios that are accessible to that Site for Beta test, and it is hoped that all radios in the Site will be interfaced. To avoid duplication of efforts, and to enhance productivity within the Sites, TAPR will coordinate the cases of multiple sites with the same radios. Some sites will design the interface; others will evaluate it. The results of all these tests, along with detailed schematics and any needed hardware patches in the wire-wrap area, will be compiled by TAPR for inclusion in the TNC Installation Manual.

Similarly, the Hardware aspects of computer/terminal interfacing will be developed, tested, proven, and documented at the various sites. A description of any adapter that must be fabricated, such as a parallel port for the TRS-80-I or the ZX-80/81, will be compiled for inclusion in the same TNC Installation Manual. Additionally, software guidelines and flowcharts will be sent to each Beta Site for development of drivers to allow all personal computers in the Beta Test to communicate on the TAPR TNC. The software will be documented, tested by other Sites, then compiled and included in the TNC Installation Manual. Naturally, the Tucson group stands ready to assist the various Sites in the attainment of these goals.

Other hardware goals of Beta Test include reliability information and documentation. Documentation is considered to be a primary goal by the Hardware group. How often have you purchased a piece of Amateur equipment, and paid a professional price for it, only to find the manual aimed at a CBer? The other cases included no documentation or "service manual" extra (like \$25 or so).

The TAPR TNC will include a complete, blow-by-blow description of the circuitry, both at the block diagram and detailed schematic levels. The Installation Manual will include complete information for radio and computer/terminal interface, with any needed software drivers listed and hardware adapter schematics provided. A User's Guide will detail the operation of the TNC and explain the theory of the TAPR protocol.

The overall goal of all of this testing, documentation, etc., is to make the Packet Mode available to the non-technical Amateur community as well as to the technical, experimentally oriented types. TAPR strongly believes that the advantages of Packet communication make it imperative that this mode be generally available. Beta is a necessary step in this process. Only after the system has been thoroughly field-tested will it be released to the Amateur community at large.

As may be seen, Beta Test is not merely promotional hype, nor is it a disguised marketing effort. It is, in fact, a comprehensive testing procedure designed to maximize the utility and help promote the acceptance of Packet Radio by the Amateur Community. If San Diego is any clue, Packet will be to the 1980's what fm was to the 70's and ssb was to the 60's.

If you would like more information on Beta Test, or desire to participate, please contact TAPR at the address given at the top of this column. Beta Test will be limited to 75 boards.

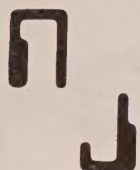
Next month, we'll list some of the more commonly heard questions about Packet Radio, as well as the answers. A report on Alpha progress will also be included. ... 73 from the TAPR Hardware gang

On other fronts, Mike Parker, now KT7D, and the Microwave committee have chosen the parts for the solid-state L-band linear amplifier for the AMSAT phase IIIB transponder. We have a new public relations group, headed by Margaret Morrison, KC7MA, who will be handling information requests and publishing a monthly newsletter. We are looking for volunteers to help with hardware and software efforts, especially people with appropriate backgrounds.

If you are interested in more information on any or all of our activities, please contact us at the address at the top of the column.

We are at a critical phase in our development as a group, and could certainly use as many members now as there are persons interested in packet radio. Your support at this time will make a difference in the acceptance of packet radio as a viable medium now and in the future.

73, TAPR



Radio Amateur Telecommunications Society

J. Gordon Beattie Jr., WB2CAM
The Radio Amateur Telecommunications Society
45 Union Avenue
Little Falls, NJ 07424
201-785-2324 (home)

R.A.T.S. is proud to announce the installation of a Vancouver-style packet repeater on 146.535 MHz. This machine is operating with three watts of transmitter power from Little Falls, NJ. The present site is not optimum. However, a site overlooking New York City will be occupied shortly. This will enhance the coverage area to a radius of about 40 to 60 miles. Additional equipment for switching of data is also planned for the site. Suggestions and inquiries from groups interested in linking to us are invited.

The entire system is quite simple to assemble. It consists of a Vancouver TNC, a modem, and a KDK 2016 transceiver. The system receives data off the air, and after error and route checking, it retransmits the packet on the same frequency. Because of this retransmission of data, it must be operated in the repeater sub-bands. The mode of repeater operation is in the time domain instead of the frequency domain as voice repeaters operate.

Great interest by the traffic-handling community has led us to work toward refining our system and future plans for it. Linking with other groups in adjacent areas is being worked out. Plans are being developed for integration of the packet facilities into the state RACES network. As these activities mature, the methods of traffic handling will evolve to complement this new technology. It seems appropriate that more traffic will be passed at the convenience of the sending station instead of at a scheduled net time. This should lead to more-rapid delivery of traffic. This is not to suggest that operator involvement will decrease or that conventional nets will disappear. The volume of traffic on each end of the network for local nets to input and output will increase because of the improved attraction of the transfer mechanism. In addition to the current style of traffic, there will be additional traffic types handled by this network. They include computer-to-computer file transfers, messages to and from computerist/hams, and eventually voice and video. The latter two items will come when the bandwidth and routing situations are improved.

R.A.T.S. has plans to publish a packet-switching protocol called RATSPAC. This protocol will provide real honest-to-goodness virtual circuit service for the amateur packet community. This protocol will be coded for the Vancouver and TAPR TNCs during the summer and early fall of 1982.

The concept behind virtual circuits is that a path is established, then data is transferred down the path with minimal overhead and maximum speed. Most of the current suggestions, quite regrettably, have been proposing the use of datagrams. Datagram service is one which includes full routing information in each packet. This is extremely bulky and inefficient. With the exception of the U.S. Government, no carrier public or private has implemented datagram service. It is felt by many that the reliability of virtual circuits, coupled with the rapid drop of hardware costs, point one to a VC-based network. It should be noted that most members of the CCITT believe datagrams to be inconsistent with good packet-switching technology and in fact voted to allow it to exist as an option, not mandatory facility for

packet-switched networks. Alternatives suggested were such procedures as "Fast Select." This is a procedure which allows an otherwise normal Call Request to contain up to 128 bytes of user data. However, additional packets may be transferred after the Fast Select Call Request by the use of standard data packet procedures. A special Fast Select Call Clear must be used to clear this type of call. Comments on this issue are most welcome.

R.A.T.S. has bulletin board software for the TRS-80 Models I or III. The group through creativity of Mike Friedman, WB2WNX, has an elaborate message system which will service users accessing via the telephone system. A version for use by stations on the air is under development and should be ready within a few weeks. The best part about it is that it is free! It may be obtained by sending two 5 1/4-inch disks and a well-padded, s.a.s.e. to: Michael Friedman, WB2WNX, 300 Parsippany Rd, Apt 201, Parsippany, NJ 07054.

R.A.T.S. operates three bulletin board systems which are accessible via Ma Bell. These systems provide the community with information which otherwise might not be distributed on a timely basis. There are plans to put one or more of these systems on our packet network during July 1982. They are available 24 hours a day except when down for maintenance or use by the owner:

R.A.T.S. N.E.S.T. 1
Mike Friedman, WB2WNX
Parsippany, NJ
201-887-8874
Bell 212A/103
System Software

R.A.T.S. N.E.S.T. 2
Gordon Beattie, WB2CAM
Little Falls, NJ
201-785-3565
Bell 212A/103/Vadic 3400
Packet Radio

Through friends of this group, we have Vancouver software. If you or your group requires this, we will be happy to forward the hex or source files. The hex file is up on R.A.T.S. N.E.S.T. 2, and a list of zaps will be added shortly.

There are two TNC boards available. The Vancouver TNC has debugged software, requires outboard modem and keying circuitry, and has limited memory. The TAPR TNC has an on-board Bell 202 modem, keying for the transmitter, plenty of memory space, an EEPROM for nonvolatile parameter storage, and a time-out timer. The TAPR group has produced an on-board FORTH interpreter and plans to use this language to bring up software which speaks both Vancouver and TAPR protocols. The R.A.T.S. protocol will be available for either board with features limited by the hardware.

R.A.T.S. is also developing a high-speed packet interface which will support speeds up to 48 kilobaud. This will be based on either the Z80, Z800 (not Z8000) and 68000 microprocessors. At this time we are evaluating the cost-vs.-capability tradeoffs. We are also looking at the Z80 Serial I/O and the Z8530 Serial Communications Controller. Both offer two asynchronous or bit/byte-synchronous ports. However, the Z8530 offers internal baud-rate generation, NRZI encoding, and internal loopback diagnostic facilities. We would appreciate any comments that can be offered. Current plans call for a board design to be debugged before September 1, 1982.

80-U.S.

THE TRS-80 USERS JOURNAL

If you own a TRS-80® Model I, Model II, Model III, the Color Computer, or the new Pocket Computer, YOU NEED 80-U.S.!

The 80-U.S. Journal has

programs for your enjoyment and enlightenment. Every issue contains several Basic or machine language program listings. It contains Business articles and program listings. No matter where you are, there is something for YOU in the Journal!

and...

The Journal contains reviews of hardware and software. Our "Evaluation Reports" will help you make the best choice in selecting additions to your system.

Save Over 50%

You can save over 50% off the cover price of 80-U.S. Journal. For the remarkably low price of *only* \$16.00, a savings of \$20.00 (cover price), you will receive a wealth of useful information every month. As a special *BONUS*, if you enclose payment with your order, you will receive an extra issue for each year of your subscription order. *Order three years of 80-U.S. and receive three extra issues! At no cost to you!*

Is your
TRS-80
Lonely?

Write today for
our

"No Risk Offer"

SEND TO:

80-U.S. Journal
3838 South Warner Street
Tacoma, Washington 98409
Phone (206) 475-2219

Name _____

Address _____

City _____ State _____ Zip _____

Visa/MC _____

Exp. Date _____

☐ 1 yr. \$16 ☐ 2 yrs. \$31 ☐ 3 yrs. \$45

Please allow 6 to 8 weeks for your first issue.

AMA

TRS-80 is a Registered Trademark of the Tandy Corp.



PROTOCOL

David W. Borden, K8MMO
Rte 2, Box 233B
Sterling, VA 22170
703-450-5284

New Jersey Amateur Packet Radio Meeting

On June 19, 1982, AMRAD representatives Paul Rinaldo, W4RI, Jon Bloom, KE3Z, and yours truly traveled to Bell Telephone Laboratories in Murray Hill, New Jersey for a packet radio meeting set up by Paul Newland, AD7I. It was an excellent session in which we heard talks by the New Jersey packet contingent that included:

- Packet Organization for the Northeast by Steve Robinson, W2FPY
- Packet Routing by Phil Karn, KA9Q
- Hf Data Communications (AMTOR) by Paul Newland
- Networking Architecture by Steve Robinson, W2FPY
- Virtual Circuit Protocols by Gordon Beattie, Jr., WB2CAM

These talks were full of good packet information and illustrated the thinking of the New Jersey Packeteers to date. Two ideas predominated the early discussion, regional-level Packets and X.25 in the local area network.

In listening to Steve Robinson, it became evident that he has carefully thought out the unique problems of the New York-New Jersey area and outlined the communications controllers required. He illustrated various packet media (satellite, backbone network, hf, landline) and from each medium a communications controller (a two-port HDLC computer, essentially) connected to a region net. From each regional net (it was clear several are required for their area) a communications controller connected the region to local area nets. It can be seen from his drawings that the

AMRAD S-100 two port HDLC board being built by Terry Fox, WB4JFI, is a large part of getting the network off the ground.

Gordon's talk on an X.25-type protocol (RATSPAC) was in line with AMRAD's latest investigations on virtual circuit protocols. We invited Gordon to Washington for further X.25 discussions in several weeks.

AMRAD made a presentation to the group which essentially asked for agreement on using NBS Internet as the backbone network protocol. Although there was some support for a virtual-circuit internet protocol, the New Jersey packeteers agreed that work should go ahead on the NBS Internet Protocol. Jon Bloom, KE3Z has begun the code work with addressing scheme to be still worked out.

Magnuski Coding Again

Hank Magnuski, KA6M, is once again coding up a storm in San Francisco. In his latest scheme, Hank puts the callsign at the front of each packet at the beginning of the Information field:

FLG ADR CTL FMCALL TOCALL ID0 ID1 INFO FCS FLG

Hank writes: A link-level packet going from A to B will have CALLA and CALLB in the header, with no exceptions. This applies to the repeater as well, which keeps a table of how to redirect packets. All packets transmitted by the repeater have its call in the FMCALL field. This format allows direct connects, AMSAT PHASE III with no controller, and repeater linking on the same frequency (by changing the ADR 8 bit address (currently FE). We are looking forward to testing it here in Washington.

AMRAD

Amateur Radio Research and Development Corporation

Membership Application/Renewal

Mail to: Dr. William P. Pala, WB4NFB
5829 Parakeet Drive
Burke, VA 22015

See reverse for
overseas mailing
rates.

	Annual	Life
Dues: Regular	\$15	\$180
2nd in family same adr	8	96
Full-time student	5	-

Please make checks payable to AMRAD.

Name _____
Ham _____ Home _____
Call _____ Phone() _____

Address _____
City, _____
State/Prov _____ ZIP/PC _____

I agree to support the purposes of the Corporation.

Class License _____ ☐ ARRL Member
Interests:
☐ Packet Radio ☐ Spread Spectrum
☐ RTTY ☐ Deaf TTY
Computer model _____
Microprocessor type _____

Signature _____

The Amateur Radio Research and Development Corporation (AMRAD) is a worldwide club of over 500 amateur radio and computer experimenters. It is incorporated in Virginia and is recognized by the U.S. Internal Revenue Service as a tax-exempt scientific and educational organization.

The purposes of AMRAD are to: develop skills and knowledge in radio and electronic technology; advocate design of experimental equipment and techniques; promote basic and applied research; organize technical forums and symposiums; collect and disseminate technical information; and, provide experimental repeaters.

Meetings are on the 1st Monday of each month at 7:30 P.M. at the Patrick Henry Branch Library, 101 Maple Ave E, Vienna, VA. If the first month is a holiday, an alternate date will be announced in the newsletter. Except for the annual meeting in December, meetings are normally reserved for technical talks - not business.

WDRIWG/R is an open repeater for digital communications (including RTTY), voice and experimental modes. It is located at Tyson's Corner, McLean, VA. It features semi-private autopatch available to licensed members. Frequencies are: 147.81 MHz in, 147.21 MHz out. The repeater director is Jeff Brennan, WB4WLW, 7817 Bristow Dr, Annandale, VA, 22003, 703-354-8541.

The AMRAD CBBS, 703-734-1387, is operated by Terry Fox, WB4JFI. The system accepts 110, 300, 450 and 600-baud ASCII, Bell 103.

Handicapped Education Exchange, 301-593-7033, is operated by Dick Barth, W3HWN. HEX accepts both 110/300-baud ASCII and deaf TTY callers.

AMRAD is affiliated with the American Radio Relay League (ARRL), the Foundation for Amateur Radio (FAR), the Northern Virginia Radio Council (NOVARC) and the Mid Atlantic Repeater Council (T-MARC).

The AMRAD Newsletter is mailed monthly to members and other clubs on an exchange basis. Technical articles, product announcements, news items, and other copy relating to amateur radio and computing are welcome. Honorariums at a rate of \$15 per printed page (\$20 maximum per author per issue) are paid for original material accepted. Classified ads are free to members. Commercial ad inquiries are invited. The editor reserves the right to reject or edit any portions of the copy. Items should be mailed by the 8th of the preceeding month to Paul Rinaldo, W4RI, 1524 Springvale Ave, McLean, VA 22101. Full permission for reprinting or quoting items is granted provided that credit is given to both the author and the newsletter. Miling to U.S. and possessions is by 3rd Class bulk mail. Canadian and Mexican addresses add US\$2 for postage. Overseas readers add US\$8 for air mail or US\$2.30 for surface.

AMRAD officers for 1982 are:

Gerald Adkins, N4GA	Treasurer
Richard Barth, W3HWN	Alternate
	HEX Sysop
David W. Borden, K8MMO	Alternate
Jeffrey Brennan, WB4WLW	Director
	Repeater Trustee
Robert E. Bruninga, WB4APR	Vice President, Asia
Terry L. Fox, WB4JFI	Director
	Vice President
	CBBS Sysop
Dr. William P. Pala, Jr., WB4NFB	Director
	Secretary
Paul L. Rinaldo, W4RI	Director
	President
	Editor
Elton A. Sanders, WB5MMB	Director

The AMRAD Library is operated by Tedd Riggs, KC4YN, 8402 Berea Ct, Vienna, VA 22180, 703-573-5067. Donations are tax-deductible.

Our CompuServe/Micronet number is [72345,1050], which is serviced by Bill Pala, WB4NFB.

Amateur Radio Research and
Development Corporation
1524 Springvale Avenue
McLean, VA USA 22101

Nonprofit Organization
U.S. Postage
PAID
McLean, Virginia 22101
Permit No. 1511

1/83 M
HANK S. MAGNUSKI KA6M
311 STANFORD AVE
MENLO PARK CA 94025